

WHAT IS CLAIMED IS:

1. A valve timing control system for an internal combustion engine, comprising:

crank angle detection means for generating a crank angle position signal corresponding to a rotational angle of a crank shaft in an internal combustion engine;

cam angle modifying means for modifying at least a relative position of a crank shaft and a cam shaft for one of air intake and gas exhaust;

cam angle detecting means for detecting a cam angle modified by the cam angle modifying means;

drive means for driving the cam angle modifying means;

target value calculating means for calculating a target value depending on an operation state of the internal combustion engine;

cam angle control means for controlling the cam angle detected by the cam angle detecting means to coincide with the target value calculated by the target value calculating means;

learning means for learning a control signal outputted to the drive means at a time when the target value and the cam angle substantially coincide; and

failure detecting means for detecting a failure of the cam angle modifying means,

wherein the failure detecting means modifies a failure detection condition according to whether or not learning is completed by the learning means.

2. A valve timing control system for an internal combustion engine according to claim 1, wherein the failure detecting means modifies a duration until the failure is

detected, according to whether or not the learning is performed by the learning means as the failure detection condition.

3. A valve timing control system for an internal combustion engine according to claim 2, wherein the failure detecting means sets the duration until the failure is detected to be longer before than after the learning is performed by the learning means.

4. A valve timing control system for an internal combustion engine according to claim 1, wherein the failure detecting means uses the cam angle detected by the cam angle detecting means as the failure detection condition.

5. A valve timing control system for an internal combustion engine according to claim 1, wherein the failure detecting means uses the target value calculated by the target value calculating means and the cam angle detected by the cam angle detecting means, as the failure detection condition.

6. A valve timing control system for an internal combustion engine according to claim 4, wherein the failure detecting means sets the duration until the failure is detected to be longer before than after the learning is performed by the learning means.

7. A valve timing control system for an internal combustion engine according to claim 5, wherein the failure detecting means sets the duration until the failure is

detected to be longer before than after the learning is performed by the learning means.

8. A valve timing control system for an internal combustion engine according to claim 1, wherein the failure detecting means uses a differential between the target value calculated by the target value calculating means and the cam angle detected by the cam angle detecting means, as the failure detection condition.

9. A valve timing control system for an internal combustion engine according to claim 8, wherein the failure detecting means sets a duration until the failure is detected to be longer before than after the learning is performed by the learning means.

10. A valve timing control system for an internal combustion engine according to claim 1, wherein the learning means holds a learning value even after an ignition switch is turned off.

11. A valve timing control system for an internal combustion engine according to claim 1, wherein, when the learning by the learning means is not performed, failure detection by the failure detecting means is not performed.